MINERALOGICAL ABSTRACTS

(Vol. 8, No. 10, June, 1943.)

New Minerals.

AGINTZEV (O. E.)] Звягинцев (O. E.) Zviagincev (O. E.). *New mineral species of the platinum group.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26, pp. 788–791, 5 figs. [M.A. **8**–53.]

tinum from placers near the Cu-Ni-S ore-deposit of Norilsk, northern Siberia, he form of angular grains (0·1–6 mm.) and cubic crystals, the latter as imensional cubes, or as flattened or elongated cubes, sometimes with sunken or pyramidal faces (*hk*0), and twinned on (111). They are magnetic and of ble sp. gr. up to 18·51. Three analyses of aggregate lots of grains graded ding to size gave Pt 47·5–53·3, Pd 11·7–12·5, Fe 25·7, Ni 1·0, Ag 0·1–0·2, 1–0·2 %, Cu, Pb traces. This ferro-palladic platinum is considered to be a mineral species. Seven analyses of separate grains show wider variations: ·50–74·15, Pd 1·95–14·07, Fe 12·87–25·30, Ni 0–25·64, Cu 1·22–9·28, S 0·25– insol. 0·11–0·85 %, Ir, Rh nil. The extreme member of the series, containing 5·50, Pd 3·57, Fe 25·30, Ni 25·64, Cu 9·28, S 0·71, insol. 0·40, is named *skite.* The intrusion of Cu-Ni ores penetrates coal beds, and it is suggested the platinum minerals were deposited from gases containing carbonyls.

L. J. S.

ASIMOVSKY (V. I.) Герасимовский (В. И.). *Metaloparite, a new mineral from the Lovozero tundras.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 33, pp. 61–63.

his occurs as pseudomorphs after loparite in the form of interpenetrating ned cubes with brownish-yellow colour and greenish-yellow streak; sp. gr. , H. 5. Thin sections show an aggregate of minute birefringent grains, 24. Analysis by I. D. Borneman-Starynkevich gave SiO_2 1·27, TiO_2 44·01, O_5 10·78, Ta_2O_5 0·66, rare-earths 34·20, Fe_2O_3+FeO n.d., CaO+SrO 5·35, O+K_2O 0·23, H_2O 3·49 = 99·99. This differs from loparite [M.A. **8**–223] ontaining water in place of alkalis. The mineral occurs in altered rocks where heline has been changed to sericite and zeolites. L. J. S.

SHKOV (G. S.) Горшков (Г. С.). *A new mineral from the region of lake Inder.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 33, pp. 254–256, 1 fig.
ORNIKOVA (N. Y.) & Godlevsky (M. N.)] Икорникова (Н. Ю.) и Годлевский (М. Н.) Ikornikova (N. J.) and Godlevsky (M. N.). *The new borate—metahydroboracite.* Ibid., pp. 257–258, 1 fig.

nder the names inderborite and metahydroboracite these two papers describe same species, which is the tenth borate mineral to be recorded from the er deposits in Kazakhstan [M.A. **6**–336, 472; **7**–122, 476, 555; **8**–53]. In position, $CaMgB_6O_{11}.11H_2O$, it resembles hydroboracite (with $6H_2O$). The urless monoclinic crystals have a lanceolate habit with large prism and steep ipyramid faces; cleavage (100) perfect. Slightly different data are given in two papers:

(1) B_2O_3 41·70, MgO 8·00, CaO 11·27, ign. 39·48 = 100·45; sp. gr. 1·928–1·9
H. $2\frac{1}{2}$; α 1·496, β 1·521, γ 1·538–1·544, optic axial plane (100), $\alpha:c = 0$–
2V 80–86°, negative; $a:b:c = 1{\cdot}6346:1:1{\cdot}3173$, β 89° 12′.

(2) B_2O_3 40·90, MgO 8·01, CaO 11·16, R_2O_3 0·02, insol. 0·01, ign. 39·54 = 99·
sp. gr. 2·004, H. $3\frac{1}{2}$; α 1·483, β 1·512, γ 1·530, $\beta = b$, $\alpha:c = 2\frac{1}{2}°$, 2V 7
negative; $a:b:c = 1{\cdot}6395:1:2{\cdot}6346$. L. J. S

Naboko (S. I.) Набоко (С. И.). *On a new fluoric mineral occurring in the sublima of the volcano Klyuchevsky.* Compt. Rend. (Doklady) Acad. Sci. UR 1941, vol. 33, pp. 140–143.

A pale yellow crust in fumaroles (temp. 98–170°) on basalt lava flows from t volcano in Kamchatka is optically isotropic with n 1·383. Analysis by V. Nek sova, F 43·40, Cl 0·81, Al 14·96, Fe 1·43, Mg 5·22, Ca 7·99, Na 3·43, K 0· H_2O+ 11·60, H_2O- 1·86 [= 91·59], corresponds approximately to $NaCaMgAl_3F$ $4H_2O$. The mineral differs from ralstonite in containing more calcium and its lower refractive index. L. J. S.

[Sedletzky (I. D.) & Yusupova (S. M.)] Седлецкий (И.) и Юсупова (С Sedletzky (I.) and Yussopova (S.). *Argillaceous minerals closely approa ing halloysite.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 2 pp. 944–947, 2 figs. [M.A. **8**–147.]

A white fatty refractory clay bedded with sandstones in lagoon-continen deposits of Jurassic age occurs at Ablyk, Angren river, Uzbekistan. The coar fraction consists of kaolin and quartz, while the colloidal fraction ($< 0{\cdot}2\mu$) ga on analysis SiO_2 45·12, TiO_2 0·29, Al_2O_3 30·01, Fe_2O_3 2·88, MnO trace, MgO 1·2 CaO 1·10, Na_2O 0·154, K_2O 2·12, P_2O_5 0·169, H_2O+ 13·63, H_2O- 3·24 corresponding with $0{\cdot}24(K_2,Mg,Ca)O.R_2O_3.2{\cdot}54SiO_2.2{\cdot}94H_2O$. Assuming th some K, Mg, and Ca was leached out in the process of isolation, the formula given as $RO.2R_2O_3.5SiO_2.6H_2O$. Heating curves show endothermal breaks 127° and 589° and an exothermal break at 970°, close to those for halloysit The X-ray pattern also shows some similarity to that of halloysite but with strong line d 5·20 Å. (instead of 4·44 typical of halloysite). The material of t fine fraction is named *ablykite*; it bears a similar relation to halloysite that pseud pyrophyllite bears to pyrophyllite. L. J. S.

Alexander (L. T.), Faust (G. T.), Hendricks (S. B.), Insley (H.), & McMurd (H. F.). *Relationship of the clay minerals halloysite and endellite.* Amer. Mi 1943, vol. 28, pp. 1–18, 11 figs.

'In an attempt to eliminate this confusion' [augmented by several errors a mis-statements] in nomenclature, the name endellite is suggested for $H_4Al_2Si_2O$ $2H_2O$, the 'hydrated halloysite' of Hendricks [M.A. **7**–422]; while halloysite limited to the kaolinite composition $H_4Al_2Si_2O_9$ [i.e. metahalloysite, M.A. **6**–18 **7**–96]. The former is derived from basic igneous or metamorphic rocks, and c partial dehydration passes into the latter. For the former sp. gr. 2·11–2·1 n 1·540–1·552, and for the latter sp. gr. 2·58–2·60, n 1·551–1·556. Chemic analyses are given of material dried at 110° C. from several localities and formul of the type $Al_{m-n}(Al_nSi_{2-n})O_5(OH)_4X_a$ are deduced. Interesting electron micr scope photographs (×10,000–18,000 diameters) of both show no difference

structure of both is of the kaolinite type, but with the layers usually superposed in a less orderly manner, and with alternate single layers of water molecules in the more hydrated form. L. J. S.

CONNELL (Duncan). *Griphite, a hydrophosphate garnetoid.* Amer. Min., 1942, vol. 27, pp. 452–461, 1 fig.

X-ray powder photographs of griphite from near Harney City, Pennington County, South Dakota (described and analysed by W. P. Headden, 1891) show a body-centred cubic lattice similar to that of garnet, although the symmetry is probably lower. It has sp. gr. 3·40, n 1·64–1·66, and contains inclusions of triplite, manganite(?), pseudowavellite, etc. The unit cell a 12·26 Å. contains 8 mols. $(Al,Ca,Fe)_3Mn_2(PO_4)_{2\cdot5}(OH)_2$, conforming with the general formula $X_3Y_2(ZO_4)_{3-m}(OH)_{4m}$ for the *garnetoids*, i.e. substances with structures similar to that of the true garnets, e.g. hydrogarnets [M.A. **8**–101], berzeliite [M.A. **6**–183], and eudialite [M.A. **7**–92]; this formula being a variation of the garnet formula $X_3Y_2(ZO_4)_3$. Schorlomite from Magnet Cove, Arkansas, with a 12·00 Å., is discussed as a true garnet rather than as a garnetoid. For uvarovite from Washington, Nevada Co., California, a 11·97 Å. L. J. S.

CONNELL (Duncan). *Isomorphism and isotypism amongst silicates and phosphates.* Science, New York, 1943, vol. 97, pp. 98–99.

Isotypes with similarity of crystal-structure may in some cases show a limited amount of isomorphous replacement; and there is no sharp distinction between isotypism and isomorphism. Examples are given of the garnets and garnetoids with general formula $X_3Y_2(ZO_4)_{3-m}(OH)_{4m}$, and the apatite group $X_{10}(F,OH,Cl)_2(ZO_4)_6$, where Z may be P, As, V, S, Si, Cr, and C. L. J. S.

HISSON (Brian). *Mangualdite is manganvoelckerite!* Geol. För. Förh. Stockholm, 1942, vol. 63 (for 1941), pp. 383–386.

Chemical, optical, and X-ray examination shows that mangualdite is identical with the mangan-oxyapatite manganvoelckerite [M.A. **7**–10]. The original analysis of mangualdite from Mangualde, Portugal [M.A. **6**–441], is faulty: determination gives P_2O_5 41·46, FeO 2·32, MnO 6·65, MgO 0·04, CaO 47·66, NiO trace, Na_2O 0·26, F 1·56, Cl 0·50, H_2O+ 0·10, insol. 0·04, less O for F 0·66, = 99·93; ω 1·646, ϵ 1·642, a 9·32, c 6·81 Å., sp. gr. 3·28. The name mangualdite should be discarded. C. F. D.

Mathematical Crystallography.

DONNAY (J. D. H.). *Derivation of the thirty-two point-groups.* Univ. Toronto Studies, Geol. Ser., 1942, no. 47, pp. 33–51, 10 figs.

The international symbols for the symmetry elements of the crystal classes [M.A. **5**–202] are obtained directly by combining the possible rotation axes, 1, 2, 3, 4, 6, and the possible inversion axes or their equivalents, $\bar{1}$ (centre), $\bar{2}$ (mirror), $\bar{3}$ (3+centre), $\bar{4}$ (irreducible), $\bar{6}$ (or $3/m$), in all compatible ways, with the help of eight theorems of symmetry. A table is given correlating the international symbols with the names of the crystal classes based on holohedry and merohedry (after Friedel) and those based on the general form (after Groth). M. A. P.

Wolfe (C. W.). *Crystallographic procedures.* Amer. Min., 1941, vol. 26, pp. 55–9 17 figs.

Standardized methods are put forward for the presentation of morphologi data, symmetry notation, and nomenclature, and standard significant lett for certain forms in each system are suggested. Formulae for crystallograp calculations on the Goldschmidt gnomonic system are set out in detail. T preferred type of angle table and set of elements is very elaborate. M. H. H.

Burfoot (J. D., *Jr.*). *A. C. Gill's development of the concept of unique diameters crystallography.* Amer. Min., 1941, vol. 26, pp. 617–626.

A unique diameter of a crystal is a direction different from any other in t crystal. The applications of this concept are considered in detail, especially t relation of unique diameters to symmetry elements, the possible arrangeme of unique diameters in a crystal, the definition of the crystal systems in terms unique diameters, and their application to the practical determination of cryst symmetry and the allocation of reference axes. M. H. H.

Reinicke (Richard). *Über gleichzeitig auf Würfel- und Kugeloberflächen gelege »merkwürdige Punkte«.* Zeits. Krist., 1941, vol. 103, pp. 355–358.

Continuation of a previous paper on the packing of cubes and spheres [M. **7**–240]. L. J. S.

Melmore (Sydney). *Open packing of spheres.* Nature, London, 1942, vol. 14 p. 412, 2 figs.

A homogeneous structure with density 0·042 is described in which each sphe is in contact with three others. F. A. B.

Gliszczynski (S. von). *Beitrag zur Doppeldeutigkeit kubischer und tetragona Zwillinge nach* (*hk*0). Zentralblatt Min., Abt. A, 1941, pp. 18–21, 1 fig.

Twinning on (*hk*0) of cubic and tetragonal crystals is equivalent to twinnin on ($h+k.h-k$.0), since the sum of double the angles of these forms to (100) 90°, e.g. twins of galena on (210) or (310) [M.A. **5**–39]. L. J. S.

Rosický (Vojtěch). *Ein Beitrag zur Kristallprojektion.* Zeits. Krist., 194 vol. 103, pp. 71–72, 2 figs.

Graphical and numerical solutions are given for the problem of finding a zo to pass through a given pole and make a given angle with a given zone. M. H. H.

Friauf (James B.). *Nomograms for the solution of spherical triangles.* Jour Franklin Inst. Philadelphia, Pa., 1941, vol. 232, pp. 151–174, 7 figs.

These are intended for problems in navigation, but they may afford usef checks in crystallographic calculations. L. J. S.

Fisher (D. Jerome). *A new projection protractor.* Journ. Geol. Chicago, 194 vol. 49, pp. 292–323, 419–442, 21 figs. Abstract: Amer. Min., 1939, vol. 2 no. 12, pt. 2, p. 6.

A protractor with various scales for constructing stereographic, gnomoni cyclographic, and euthygraphic projections for use in crystallography, geolog seismology, astronomy, cartography, navigation, &c. Examples of variou problems are worked out. L. J. S.

(John C.). *Use of the Wulff net in mineral determination with the universal stage.* Amer. Min., 1940, vol. 25, pp. 689–707, 8 figs.

clear and detailed description of the use of the Wulff stereographic net dly familiar to those who employ Fedorov stage methods. Instructions are given for transforming the projection to conform with standard reference s, such as those prepared by Reinhard. F. A. B.

Physical Properties.

INDER (P.) & LOGGINOV (G.)] Ребиндер (П.) и Логгинов (Г.) REHBINDER (P.) and LOGGHINOV (G.). *Changes in the elastic properties of mica caused by the penetration of a liquid into a strained crystal.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 30, pp. 491–495.

hen a crystal is cleaved, scratched, drilled, or cut, considerably less force is red if the operation takes place in a fluid or solution that is adsorbed by the al. Previous work in this field is shortly reviewed, and it is now shown that effect is also shown under much smaller stresses, in the region of elastic rmation, the Young's modulus being markedly reduced. The phenomenon lly slowly developed, and is explained as due to adsorption in micro-cracks. M. H. H.

NFELD (M.) & SHESTIKHIN (P.) Корнфельд (М.) и Шестихин (П.). *Elasticity of a crystal as dependent on temperature.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1942, vol. 36, pp. 52–56, 3 figs.

he rigidity modulus of crystals of ice, tin, and stearine, determined from the city of propagation of high-frequency elastic waves at various temperatures 88° K., shows a gradual decrease with rise in temperature and a sudden fall the melting-point. L. J. S.

RZEJEWSKI (H.). *Elastische Eigenschwingungen von Kristallen bei gemischten Randbedingungen.* Zeits. Krist., 1939, vol. 101, pp. 94–116, 9 figs.

theoretical study of the vibrations of crystalline bodies under stated boundary itions. F. A. B.

TSCH (H.). *Einige Versuche über Schlag- und Druckfiguren.* Neues Jahrb. Min., Abt. A, 1940, vol. 76, pp. 291–314, 5 figs.

ercussion and pressure figures on (100), (110), and (111) of halite and sylvine surrounded by bands of birefringence. The figures on (100) and (111) of te, dolomite, and chalybite, and on (010) of gypsum are also described. on (001) of the laminated minerals, mica, chlorite, and talc, are there ked differences in the orientation of the percussion and pressure figures. discharge of electric sparks through plates gives no further information t percussion figures. L. J. S.

DZINSKI (Paul). *The hardness scale. A note on its history.* Gemmologist, London, 1943, vol. 12, p. 23.

— *Early hardness scale.* Ibid., p. 31.

e Boodt (1609) mentioned that some gemstones are harder than others. scratching test was first described by Brückmann (1773). Haüy (1801)

graded various minerals according to the manner that they scratched quartz a glass. Mohs's scale (1820) of ten numbers was extended to twelve by Breithau L. J. S

Koifman (M. I.) Конфман (М. И.). *New conception of the term "hardnes* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 30, pp. 830–831.

The hardness of brittle minerals is determined by scratching and of pla metals by the resistance to penetration. There is no clear distinction betw hardness and mechanical strength. 'Hardness is a resistance of the surf layers of the body to local injury (breakage or deformation) under the influe of mechanical strains, concentrated within a limited area of the body. M concisely, the conception of hardness may be defined as a local resistance concentrated mechanical aggression or local mechanical resistance.' L. J. S

Shreiner (L. A.) Шрейнер (Л. А.). *New method for testing the hardness of r in relation to drilling.* Compt. Rend. (Doklady) Acad. Sci. URSS, 19 vol. 34, pp. 134–137, 2 figs.

In the method of static impression the indentor used has a flat surf (1–2 sq. mm.) at the end of a cylinder or truncated cone, rather than a poin contact as with a sphere or cone in the Brinell test, because rocks show plasticity than metals. The absolute hardness so determined was for limesto 5–45, granites 40–60, quartzites $70–100 \times 10^3$ kg./sq. cm. By the method dynamic impact quartzite gave 140–150 kg./sq. cm. and this is closely relate the result obtained by percussion drilling. L. J. S

Rivlin (R. S.). *Grinding and scratching crystalline surfaces.* Nature, Lond 1940, vol. 146, pp. 806–807, 1 fig.

When a point source of light is observed through a matt-ground or v scratched surface of a crystal, a pattern is formed by refraction at the sm facets of the grinding pits or scratches and is related to the crystal symmet There appear to be in most crystals a number of zones of easy fracture as wel definite cleavage planes. M. H. H

Eppler (W. Fr.). *Über die relative Korrosionshärte des Achates und einiger and Mineralien.* Zentralblatt Min., Abt. A, 1941, pp. 1–10, 2 figs.

—— *Über die relative mechanische Korrosionshärte des synthetischen Korunds u einiger anderer Mineralien.* Ibid., pp. 73–85, 3 figs.

Plates of agate cut parallel and perpendicular to the quartz fibres (which normal to the banding [M.A. **5**–381]) were subjected to a sand blast, and 'relative corrosion hardness' is defined as the specific gravity divided by the l in grams per sq. cm. Parallel to the fibre this is twice as great as ⊥ fibre, a both of them are much greater (7 and $3\frac{1}{2}$ times) than for quartz. For quartz t hardness parallel to the *c*-axis is slightly greater than on (0001). Agate conta some opal, and it has been thought that for pivots and knife-edge supports material would be hardened by ignition. But after heating at 200° the val decrease, coming together, and at 400° both are near the value for quartz. Pla were cut from artificial gem corundum parallel and perpendicular to the op

which lies in the plane of splitting of the boule and at 30–80° to the axis of oule), and here the blast was with artificial corundum powder instead of z sand. The hardness parallel to the optic axis is about 38 % higher than he perpendicular plane. The following results of the 'relative corrosion ness' II are compared with Mohs's scale I, and Rosiwal's grinding hardness M.A. 1–369]:

			1	2	3	4	5	6	7	8	9	10
..	...	...	6·2	6·2	10·1	9·9	5·0	46	100	81	594	109,000
..	...	...	0·03	1·04	3·75	4·17	5·42	31	100	146	833	117,000

lues for other materials are: opal 16–17, nephrite 80–163, jadeite 153–180, er 1406, rubber 3441. Comparison of these [erratic] results with the 'bouncing ness' suggests a relation with the elasticity of the materials. L. J. S.

(J. H.). *Effect of sapphire-crystal orientation on the wear of watt-hour-meter bearings.* Electrical Engineering (Amer. Inst. Elect. Engin.), 1941, vol. 60, pp. 811–814, 8 figs.

vot supports of natural and artificial sapphires which had been in use for al years were examined, and it was found that there had been less wear n the axis of the jewel cup was perpendicular to the *c*-axis of the crystal.
L. J. S.

LEIGH (*Lord*). *The ultimate shape of pebbles, natural and artificial.* Proc. Roy. Soc. London, Ser. A, 1942, vol. 181, pp. 107–118, 2 pls., 7 text-figs.

ost flint pebbles are of unsymmetrical shapes; a few may be approximately rical, spheroidal, or ellipsoidal, but never truly elliptical in cross-section. sionally flat oblate spheroids may show a slight concavity on the large aces. Artificially shaped spheroids of chalk abraded with nails or shot show a slight tendency to assume a spherical form, and the amount of abrasion vs no relation to the specific curvature. L. J. S.

VDEN (F. P.). *The polishing of solids and the mechanism of sliding on ice and snow.* Journ. Soc. Chem. Ind. Victoria, 1940, vol. 40, pp. 240–250.

summary of some recent work. Special attention is directed to the local ace heating effect as a factor in polishing and in the low coefficient of tic friction on ice. [M.A. 7–244, 245.] M. H. H.

GGINS (Maurice L.). *The density of silicate glasses as a function of composition.* Journ. Optical Soc. Amer., 1940, vol. 30, pp. 420–430, 23 figs.

n empirical type of formula correlating the density and composition of ate glasses is shown to hold, and the constants in the formula are evaluated 17 of the commoner elements. Borosilicate glasses bring in some complications, ch are discussed. A theoretical basis for the formulae is discussed.
M. H. H.

SSLIN (F.). *Indium-III-Jodid zur Trennung von Mineralgemischen.* Zentralblatt Min., Abt. A, 1942, pp. 33–34.

saturated aqueous solution of InI_3 (315 g. InI_3 in 100 c.c. solution) has gr. 3·438 at 20°. It is a brownish, mobile, and stable liquid. A weaker solution 5 g. in 100 c.c.) has sp. gr. 1·305. L. J. S.

Rigby (G. R.) & Green (A. T.). *The thermal expansion characteristics of s calcareous and magnesian minerals.* Trans. British Ceram. Soc., 1942, vol. pp. 123–143, 23 figs.

The percentage thermal expansion and coefficient of expansion of vari synthesized mineral aggregates were investigated at intervals of 100° C. over temperature range 100° to 1200° C. Artificial minerals reported on inch pseudowollastonite and other lime silicates, clinoenstatite, forsterite, diopsi monticellite, merwinite, åkermanite, gehlenite, anorthite, and cordierite. Ar thite shows a well-defined maximum in coefficient of expansion at about 8 and the possibility of the existence of high- and low-temperature forms, w this inversion temperature, is suggested. C. F. D

Staker (William Paul). *Thermal expansion of single and optically mosaic z crystals.* Physical Rev. (Amer. Phys. Soc.), 1942, vol. 61, pp. 653–657, 4 f

By an optical-lever method in the range 25–100° C. the coefficients of expans of single crystals of zinc were determined to be $64{\cdot}2 \times 10^{-6}$ per degree along hexagonal axis and $14{\cdot}1 \times 10^{-6}$ perpendicular thereto. L. J. S

Smith (F. Gordon). *Variation in the properties of pyrite.* Amer. Min., 19 vol. 27, pp. 1–19, 4 figs.

Chemical analyses of ten specimens of pyrite from known localities, sp. 5·000 to 5·025, yield a range of composition from $FeS_{1\cdot94}$ to $FeS_{2\cdot01}$. The spec resistance at 20° C. in known and random directions varies from 0·014 256 ohms/cm. cube; the temperature coefficient of resistance from −214 throu zero to 26·5; whilst the thermo-electric potential against copper varies fr strongly negative through zero to strongly positive and is often different different parts of the same crystal. Etching a polished crystal of pyrite revea a lineage structure with the main lineage following a body-diagonal of the cu The variations in electrical conductivity and isotropy are explained chiefly sulphur deficiency and lineage structure. A crystal with a high resistance a large negative thermal coefficient of resistance contains a large number of latt discontinuities. The data also reveal that crystals of pyrite with a positi zero, or small negative thermal coefficient of resistance are thermo-elect negative, whilst those with large negative thermal coefficient are thermo-elect positive. 'There is an indication that optically anisotropic pyrite is formed bel 135° C. by regular arrangement of Fe-atoms in S-positions.' F. A. B

Krishnan (K. S.) & Ganguli (N.). *Large anisotropy of the electrical conductiv of graphite.* Nature, London, 1939, vol. 144, p. 667.

The electrical conductivity in the basal plane of graphite is of the order 10^{-4} ohm per cm. cube, perpendicular to the basal plane about 2–3 ohm per c cube. M. H. H.

[Vorobiev (A. A.)] Воробьев (A. A.) Worobjew (A. A.). *Über die elektris Festigkeit heteropolarer Kristalle.* Compt. Rend. (Doklady) Acad. Sci. UR 1940, vol. 27, pp. 934–936, 2 figs.

The electric field necessary to break down an ionic crystal is shown, for t alkali halides, to be simply connected with the lattice energy; there is no uniq

ble connexion with the electron affinity of the halogen ions in the crystal, as current theories of electrical breakdown require. M. H. H.

HIEZER (A.) & LIFSHITZ (I.)] Ахиезер (А.) и Лифшиц (И.) AKHIESER (A.) and LIFSHITZ (I.). *On the theory of electric breakdown of ionic crystals.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 27, pp. 785–786.

he theories of H. Fröhlich (1937) and of R. Seeger and E. Teller (1939) con- ing the breakdown of ionic crystals in an electric field are criticized; an alter- ve condition for breakdown is suggested. M. H. H.

AKANTEN (P.). *Studies in crystal magnetism.* Quart. Journ Indian Inst. Sci., 1940, vol. 3, no. 2, 190 pp., 36 figs.

any determinations were made of the dia- and paramagnetic anisotropy of tals. In calcite, aragonite, strontianite, witherite, $NaNO_3$, KNO_3, NH_4NO_3, $AgNO_3$ the influence of crystal-structure on the intrinsic anisotropy of the , and NO_3 groups is considered. The orientation of crystallites of aragonite nother-of-pearl and of calcite in egg shells is determined by their diamagnetic sotropy. In biotite the paramagnetic anisotropy and also the pleochroism ease with the amount of ferrous iron. [M.A. **7**–247, 402, 403; **8**–71.] L. J. S.

Crystal-optics.

FFIELD (E. W.) & PEACOCK (M. A.). *Recrossing axial plane dispersion in goethite.* Univ. Toronto Studies, Geol. Ser., 1942, no. 47, pp. 53–61, 3 figs.

The acute bisectrix (α) is normal to (010)-cleavage plates of goethite (α-O.OH) from Cornwall throughout the range of approximate wave-lengths 0–680 mμ) and temperatures used. In the red $\gamma = c$, in the yellow and green $= a$, in the violet $\gamma = c$. At 0° C. E (optic axial half-angle in air) varies rapidly th wave-length: E 27½° at 420 mμ, 0° at 450 mμ, 49½° at 540 mμ, 0° at 669 mμ, ° at 680 mμ. At higher temperatures the E-curves are substantially displaced, e uniaxial condition appearing at 478 and 630 mμ (25° C.), 509, and 608 mμ 3° C.). At constant wave-length (590 mμ, Na), E is 42½° at 0° C. with $\gamma = a$, at 46° C., 19½° at 60° C. with $\gamma = c$. There is strong absorption in the blue and ssibly a true absorption band with discontinuity of the optical properties. [A. **1**–342.] M. A. P.

AŠIČEK (Antonin). *A new method for investigating the refractive index and the thickness of thin interference films on glass.* Physical Rev. (Amer. Phys. Soc.), 1940, vol. 57, pp. 925–931, 4 figs.

A method is described for the determination of the thickness and refractive dex of thin films, based on measurements of the degree of ellipticity of reflected ght (originally plane-polarized). The surface film developed on lead glass by eatment with sulphuric acid appears to consist of silica-glass. M. H. H.

FUND (A. H.). *The refractive index of matter in cylindrical form.* Journ. Optical Soc. Amer., 1940, vol. 30, pp. 410–412, 5 figs.

A new method is described for the determination of the refractive indices of quids and solids, using very simple apparatus. As applied to liquids, the method as the advantage of having no upper limit. M. H. H.

Turner (Francis J.). *Determination of extinction angles in monoclinic pyroxen and amphiboles.* Amer. Journ. Sci., 1942, vol. 240, pp. 571–583, 3 figs.

A critical review of the methods of determining extinction-angles ($\gamma:c$) random sections on the universal microscope stage [M.A. **8**–206]. More reliab results are obtained from twinned crystals. L. J. S.

Tuzi (Zirô) & Oosima (Hideo). *On the artificial quarter-wave-plate for phot elasticity apparatus, and its theory.* Sci. Papers Inst. Phys. Chem. Re Tokyo, 1939, vol. 36, pp. 72–81, 4 figs.

Cellophane sheets show a fairly uniform birefringence, and two sheets supe posed at a suitable angle form a satisfactory quarter-wave plate. The optic theory of the combination is discussed in detail. M. H. H.

Stein (Werner). *Über die optischen Eigenschaften des Quarzes bei den Welle längen* 8–20μ. Ann. Physik, 1939, ser. 5, vol. 36, pp. 462–484, 16 figs.

The reflectivities and absorption spectra of quartz and of silica-glass have bee measured over the infra-red range 8–20μ. Quartz shows strong dichroisn especially over the range 12–20μ. The refractive indices of quartz have bee measured over the range 15–18μ, and show marked dispersion; the birefringenc is positive and also shows marked dispersion. M. H. H.

Bryant (W. M. D.). *Optical crystallographic studies with the polarizing microscop III. Measurement of several types of selective dispersion in organic compound.* Journ. Amer. Chem. Soc., 1941, vol. 63, pp. 511–516, 5 figs.

Optical data for several organic compounds, exemplifying dispersion of th bisectrices and crossed axial plane dispersion. M. H. H.

Gross (E.) Гросс (Е.). *Debye's transverse heat waves and the scattering of ligh in crystals.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26 pp. 757–759.

Six Rayleigh line components have been measured for quartz, two only bein due to Debye's longitudinal heat waves; the remaining four are attributed t scattering from transverse heat waves. F. A. B.

Mikhailov (I. G.) Михайлов (И. Г.). *Diffraction of light from high-frequenc transversal elastic waves in cubic crystals.* Compt. Rend. (Doklady) Acad Sci. URSS, 1940, vol. 26, pp. 760–763.

Results are given on the comparable scattering of light from ultrasonic wave in crystals of potassium chloride and of potassium bromide. F. A. B.

Raman (*Sir* C. V.). *The scattering of light in crystals.* Journ. Franklin Inst Philadelphia, Pa., 1941, vol. 232, pp. 203–211, 3 figs.

A historical and general account of the Raman effect. M. H. H.

Raman (*Sir* C. V.). *Crystals and photons.* Current Sci. Bangalore, 1941, vol. 10, pp. 49–56.

A short review of some recent developments in crystal optics. M. H. H.

IAN (*Sir* C. V.), RAJAGOPALAN (V. S.), & NEDUNGADI (T. M. K.). *Conical refraction in naphthalene crystals.* Nature, London, 1941, vol. 147, p. 268, 4 figs.; Proc. Indian Acad. Sci., Sect. A, 1941, vol. 14, pp. 221–227, 2 pls.

AN (*Sir* C. V.). *The phenomena of conical refraction.* Current Sci. Bangalore, 1942, vol. 11, pp. 44–46, 8 figs.

he angle of conical refraction in naphthalene is 13° 45′; crystals large enough rovide a striking demonstration of conical refraction are easily obtained.
M. H. H.

IAN (*Sir* C. V.) & NEDUNGADI (T. M. K.). *Optical images formed by conical refraction.* Nature, London, 1942, vol. 149, pp. 552–553, 1 fig.

productions are given of images formed by conical refraction by a plate of thalene cut normal to the axis of single-ray velocity. F. A. B.

MORE (Sidney). *Conical refraction.* Nature, London, 1942, vol. 150, pp. 382–383, 3 figs.

escribes and figures the images of a pin-hole seen under a microscope through ate of aragonite when viewed along the acute bisectrix and in nearby direcs towards an optic axis. They are like those figured by H. C. Sorby in 1877 n. Mag. vol. **1**, plate VII; **15**–214], and the rings are due to conical refraction ng an optic axis. L. J. S.

AGOE (Kwan-ichi). *On interference fringes observed in some double image prisms.* Sci. Papers Inst. Phys. Chem. Res. Tokyo, 1939, vol. 36, pp. 165–172, 3 pls., 3 text-figs.

When partially or fully polarized light from an extended source passes through ochon type double-image prism, meeting the section cut perpendicular to the ic axis first, an eye placed close to the other surface observes two complentary uniaxial interference-figures, which may overlap partially. The theory this observation is discussed, and it is shown that a Rochon or a Senarmont e double-image prism, or a crystal plate cut perpendicular to the optic axis l combined with a double-image prism of Wollaston type or of calcite and glass l serve as a polariscope. A Rochon type prism of optimum angle and dimensions s found to have a sensitivity of the same order as the Savart plate when used a detector of polarized light. M. H. H.

LTOW (J.). *Das Absorptionsspektrum des Permanganations in verschiedenen Kristallgittern.* Zeits. Physikal. Chem., 1938, Abt. B, vol. 40, pp. 397 430, 15 figs.

— *Die Absorptionsspektren des Permanganat-, Chromat-, Vanadat- und Manganations in Kristallen.* Ibid., 1939, vol. 43, pp. 198–212, 6 figs.

The absorption spectra in the visible and ultra-violet of numerous mixed ystals containing the ions MnO_4'. MnO_4'', CrO_4'', and VO_4''' have been studied; some cases there is very marked dichroism. Crystals of ($BaSO_4$,$KMnO_4$) are chroic, so that the $KMnO_4$ cannot be merely included mother-liquor. The sults are discussed theoretically. M. H. H.

Jelley (Edwin E.). *Application of the grating microspectrograph to the proble of identifying organic compounds.* Ind. Eng. Chem., Anal. Edition (Ame Chem. Soc.), 1941, vol. 13, pp. 196–203, 9 figs.

With many organic compounds, the use of the immersion method for refracti index determination is limited, while birefringence determinations are not ver accurate owing to errors in the determination of the thickness. But the dispersic of the birefringence, absorption spectrum and its variation with crystallograph direction, surface colour and reflection dichroism may readily be studied by mea of a grating micro-spectrograph (described in detail), and can be of considerab value for identification. M. H. H.

Szivessy (G.). *Neuere Untersuchungen über die optischen Erscheinungen b aktiven Kristallen.* Fortschr. Min. Krist. Petr., 1937, vol. 21, pp. 111–16 5 figs.

Recent developments in the optical theory of crystals are reviewed with especi attention to optically active crystals; mention is made of several little-know phenomena, including the second-order birefringence of cubic crystals (Lorent 1922) and the possibility of optical activity in the planosymmetric class (*S*) an three other non-enantiomorphic classes (Sommerfeldt, 1906; Szivessy, 1928 Experiments with α-quartz gave excellent agreement with the theory. Th gyration of *d*-α-quartz for green light of wave-length 510 mμ is $-12{\cdot}96\times10^{-5}$ along and $+5{\cdot}82\times10^{-5}$ normal to the optic axis; the ratio in the two direction is nearly independent of the wave-length. Thus α-quartz is optically inactiv in directions inclined at 56° 10′ to the optic axis, and the gyration surface is pair of conjugate hyperboloids of rotation. M. H. H.

Polonsky (A. M.) Полонский (А. М.). *Ultraviolette Lumineszenz von durc Schwermetalle aktivierten Alkalihalogenidkristallen.* Compt. Rend. (Doklady Acad. Sci. URSS, 1941, vol. 31, pp. 543–545, 3 figs.

The fluorescence in ultra-violet rays of NaCl and KCl which have been irradi ated by X-rays is enormously increased when the salts have been activated b the presence of some silver. NaBr and RbCl are fluorescent only after being s activated. L. J. S.

Topographical Mineralogy.

Berggren (Thelma). *Minerals of the Varuträsk pegmatite. XXV. Some ne analyses of lithiumbearing mica minerals.* Geol. För. Förh. Stockholm, 1941 vol. 63, pp. 262–278, 7 pages of figs. numbered as plates. [No. XXIV M.A. **8**–181.]

Three chemical analyses are given of lithium-bearing (Li_2O 0·76—1·1 %) muscovite from Varuträsk [M.A. **8** 22], and one each of lepidolite from Utö Sweden, and Rožena, Moravia. These and many others from the literature ar calculated to the four end-members, muscovite, polylithionite, lithium-muscovite and biotite, of R. E. Stevens [M.A. **7**–353], and represented on a series of diagrams Specimens containing more than 50 % of these constituent molecules are referre

these names, and the remainder to the lepidolite series. Lithium-muscovite is cognized from several localities. L. J. S.

SON (Brian). *Minerals of the Varuträsk pegmatite. XXVII. Triplite and vivianite.* Geol. För. Förh. Stockholm, 1941, vol. 63, pp. 285–288. [No. XXVI, M.A. **8**–311.]

A single small specimen shows narrow veins of brown massive triplite in quartz d mica. It has sp. gr. 3·84, α 1·673, β 1·681, γ 1·691, 2V 76°, positive; analysis T. Berggren gave P_2O_5 30·63, Fe_2O_3 0·78, FeO 19·96, MnO 32·07, MgO trace, O 4·68, Na_2O 0·39, K_2O 0·33, Li_2O 0·10, F 6·72, H_2O+ 0·48, H_2O- 0·27, ol. 6·22, total (less O for F) 99·80, agreeing with the usual formula R_2FPO_4. e vivianite (α 1·58, γ 1·63) forms a thin blue coating on the triplite. Fluorine-aring minerals are rare in the Varuträsk pegmatite. L. J. S.

MAN (Olof H.). *Minerals of the Varuträsk pegmatite. XXVIII. On "stibio-microlite" and its decomposition products.* Geol. För. Förh. Stockholm, 1941, vol. 63, pp. 289–294, 2 figs.

Microscopical examination of polished sections of the mixture of minerals hich was supposed to be due to the breaking down of hypothetical 'stibio-icrolite' [M.A. **6**–120, **7**–99] shows cores of stibiotantalite surrounded by a ne of microlite in a rectangular network of antimony veins (following the eavage directions of the stibiotantalite), together with some stibnite, senar-ontite, quartz, albite, and muscovite. It is now suggested that the microlite id antimony are alteration products of the stibiotantalite, due to invading ydrothermal solutions. L. J. S.

MARK (Karin). *Minerals of the Varuträsk pegmatite. XXIX. An X-ray study of stanniferous columbite from Varuträsk and of the related Finnish minerals ainalite and ixiolite.* Geol. För. Förh. Stockholm, 1941, vol. 63, pp. 295–299.
UENSEL (Percy). —— *XXX. Cassiterite and stanniferous columbite.* Ibid., pp. 300–310.

Cassiterite is widely distributed in small amounts in the pegmatite, and is ometimes intimately associated with columbite. Material containing 32·6 % nO_2 proved to be a mechanical mixture of cassiterite and columbite. Several ld specimens from Finland labelled ainalite and ixiolite were also found to be ixtures of cassiterite and columbite or tapiolite. Cassiterite ('monorutile' ype of structure [M.A. **3**–182]) gave a 4·72 4·73, c 3·17–3·18 Å.; tapiolite 'trirutile' type) a 4·74–4·75, c 9·24–9·29 Å.; and columbite a 5·12–5·16, b 14·1–4·3, c 5·74–5·76 Å. Ignited mixtures suggest, however, that cassiterite may take p to about 25 % tapiolite in solid solution, and that columbite and tapiolite ay form a limited range of mixed crystals, but not cassiterite and columbite. L. J. S.

ADAMSON (Olge J.). *Minerals of the Varuträsk pegmatite. XXXI. The feldspar group.* Geol. För. Förh. Stockholm, 1942, vol. 64, pp. 19–54, 6 pls., 12 text-figs.

The central part of the body of quartz-muscovite-pegmatite has been altered by hydrothermal action in successive stages to microcline-perthite, with cleave-

landite, quartz, and a variety of lithium minerals. The hydrothermal solutions have in places converted the bordering greenstone into a sugar-grained albite rock. The formation of the microcline-perthite, which also encloses poikilitic patches and veins of albite, is attributed to the invasion of microcline by albite rather than to exsolution. It contains Rb_2O 0·58–3·30, Cs_2O 0·1–0·7 %. The microcline has extinction on (001) 18–20°, on (010) 3–5°, and 2V 78–82°; and the perthitic albite has extinction on (001) 2–5°, on (010) 16–20°, and 2V 76–80°. The characters of 'vein', 'patch', 'film', and 'string' perthite are described and well illustrated. Cleavelandite forms fan-like aggregates and is later than the microcline-perthite; it has extinction on (010) 20° and 2V 77°. L. J. S.

Lundblad (Britta). *Minerals of the Varuträsk pegmatite. XXXII. Optical studies of the analysed micas from Varuträsk.* Geol. För. Förh. Stockholm 1942, vol. 64, pp. 55–60.

Measurements of the optic axial angles (2V 36–51° and 2E 51–68°) are given for several analysed specimens of muscovite and lepidolite. [M.A. **8**–22, 352.] All are poor in iron, and no relation can be traced between the optical data and the lithium content (Li_2O 0·22–5·95 %). L. J. S.

Quensel (Percy). *Förteckning över intill 1942 identifierade mineral från Varuträskpegmatiten.* Geol. För. Förh. Stockholm, 1942, vol. 63 (for 1941), pp. 422–425.

—— *Die Mineralien des Lithium-Pegmatites von Varuträsk.* Min. Petr. Mitt. (Tschermak), 1942, vol. 53, pp. 354–357.

This deposit, discovered in 1933, has been worked for lithium ore since 1935. A list is given of about 50 minerals found there up to November 1941, with brief notes on the more important and interesting species. [M.A. **6**, 485–7; **7**–**8**.] L. J. S.

Edwards (Tom). *The mineral deposits of the U.S.S.R.* Mining Mag. London, 1938, vol. 58, pp. 265–279, 335–343; 3 figs., 2 maps.

A list of metals and minerals (including coal and petroleum) with a description of the mines in which they are found and notes on the output and reserves. J. M. S.

Robinson (A. J.). *Report of the Geological Section.* Bull. Soc. Jersiaise, 1938, vol. 13, pp. 285–289.

Several of the outlying reefs near Jersey have been visited, and much new information on their geology has been obtained. A number of sulphate minerals—melanterite, copiapite, epsomite, and mirabilite—were found as efflorescences during the dry summer; further, occurrences of anatase, fire-opal, garnet, and pseudomorphs of chalcedony after calcite have been discovered. [M.A. **6**–153, 154.] M. H. H.

Marín (D. Agustín). *Recursos minerales de España.* Bol. R. Soc. Geogr. Madrid, 1942, vol. 78, pp. 85–183, 234–283, 15 figs.

Details, together with comparative statistics of other countries, are given for coal, petroleum, bitumen, ores of Fe, Mn, Sn, W, Mo, V, Ni, Co, Ti, Be, Au, Ag, Cu, Pb, and Zn. Some of these yield no production in Spain, though small occurrences are noted, and comparisons are made with world production. L. J. S.

RRA (Aurelio). *Bemerkungen über Minerallagerstätten und Gesteine der Provinzen Sassari und Nuoro in Sardinien.* Zentralblatt Min., Abt. A, 1942, pp. 9–11.

A deposit of magnetite (Fe_2O_3 72·84, FeO 25·52, MnO trace, H_2O 2·32, SiO_2 ce) with limonite and chalybite occurs at the junction of granite and schist at ro di Pattada, prov. Sassari. Manganese ores occur in prov. Nuoro.

L. J. S.

ITMEIER (Hans). *Einige neuere Mineralvorkommen im Gebiete des Habachtales, ein Beitrag zur Kenntnis der Entstehung der Zentralgranitgneise der Hohen Tauern.* Min. Petr. Mitt. (Tschermak), 1942, vol. 53, pp. 271–329, 6 figs.

New occurrences are described in detail of datolite, scheelite, garnet, large stals of adularia, albite, &c., from the Habach valley, and of violet-coloured tite in the Untersulzbach valley in Salzburg. The origin of these Alpine neral veins and of the granite-gneiss is discussed. [M.A. **5**–488; **6** 355, 506; 130.] L. J. S.

STOV (Ivan). *The Rhodopi mountains, Balkan peninsula.* Mining Mag. London, 1942, vol. 67, pp. 7–14, 3 figs.

This is a useful outline of the ore-deposits of the Rhodopi mountains in uthern Bulgaria, the site of extensive mining operations in Roman and Byntine times. The principal ore minerals, genetically associated with Tertiary yolites, trachytes, and andesites, include magnetite, haematite, pyrite, argenferous galena, blende, chalcopyrite, and stibnite. Brief descriptions of the more otable mines and occurrences are given and the metallogenesis of the deposits discussed. C. F. D.

AO (B. Rama). *Mineral deposits in Mysore. (Their origin, distribution and industrial application).* Presidential Address. Quart. Journ. Geol. Mining & Metall. Soc. India, 1942, vol. 14, pp. 157–184.

An outline is given of the geology and mineral occurrences. Mysore produces ll the gold and the bulk of the chromite in India. Ores of Fe, Mn, and Cu are orked and there are small amounts of Pb, Zn, As, and Sb. Non-metallic minerals nclude asbestos, kaolin, &c., and there are a few gemstones of poor quality.

L. J. S.

DEANS (T.). *The mineral resources of Northern Rhodesia.* Bull. Imp. Inst. London, 1942, vol. 40, pp. 295–306.

In addition to the copper and cobalt ores, which yield selenium, gold, and ilver as by-products, the mineral production of Northern Rhodesia includes nica and ores of zinc, lead, vanadium, gold, bismuth, tin, iron, and manganese. There are unexploited coal and graphite deposits. Although the colony has no fficial Geological Survey, it has been mapped by mining companies 'in far greater detail than any other area of comparable size in tropical Africa'; little of the information thus accumulated has, however, been published. C. F. D.

AMM (F. L.). *The geology of the country around Bulawayo.* Bull. Geol. Surv. Southern Rhodesia, 1940, no. 35, 307 pp., 27 pls. Price 9*s.* 9*d.*

This district covers approximately 1200 square miles centred around Bulawayo. Gold-mining is the principal industry and descriptions of over 500 different mines

occupy two-thirds of the bulletin (pp. 91–284). The remainder principally comprises a general account of the geology (pp. 1–90), with petrographic descriptions and chemical analyses of Archaean greenstones, pre-Cambrian granites, and Karroo basalts. Wolframite, scheelite, baryte, pyrite, and copper have been produced in small quantities at various times. C. F. D.

Ramdohr (Paul). *Eine Fundstelle von Beryllium-Mineralien im Gebiet der kleinen Spitzkopje, Südwestafrika, und ihre Paragenesis.* Neues Jahrb. Min., Abt. A 1940, vol. 76, pp. 1–35, 2 pls., 12 text-figs.

A large fissure bordered by granite, also with miarolitic cavities, represents a pegmatite much altered by hydrothermal action, of which three phases in the paragenesis of the several minerals are distinguished. At a final stage the crystals were thickly encrusted with limonite, manganese oxides, hyalite, calcite, and later fluorite. Large crystals of beryl of the pegmatitic stage are much corroded and replaced by abundance of phenakite [Min. Mag. **23**–621], bertrandite [M.A. **6**–431], and gem beryl (aquamarine and golden beryl) [M.A. **3**–331]. Other minerals are stiepelmannite [M.A. **7**–514], good crystals of microcline, quartz as large mis-shapen and deeply corroded crystals, quartz as regular reticulated intergrowths with albite most of which was later removed, large crystals of topaz [M.A. **4**–235], mica, chalybite, orthite, ilvaite (?), pyrite, &c. L. J. S.

Frommurze (H. F.), Gevers (T. W.), & Rossouw (P. J.). *The geology and mineral deposits of the Karibib area, South West Africa.* Geol. Surv. South Africa, Explanation of Sheet no. 79 (Karibib, S.W.A.), 1942, 172 pp., 14 pls., 32 text-figs. Price 5*s.*, including map (1:125,000, 1 inch to 1·97 miles).

Many noteworthy mineral deposits are located in this area (21° 30′–22° S., 15°–16° E.). Occurrences of cassiterite, wolframite, tantalite (Ta_2O_5 30–65 %, sp. gr. 5·917–6·855), rutile, garnet, fluorite, aquamarine, topaz, and marble have been prospected and worked on a small scale. The cassiterite, occurring in 19 different districts, mainly in pegmatites, greisenized pegmatites, and quartz-blows, may be accompanied by: wolframite, tantalite, mispickel, beryl, tourmaline (black and coloured varieties), amblygonite (β 1·602, γ 1·614, 2V 80°, sp. gr. 3·045), lepidolite, zinnwaldite, fluorite, fluor-apatite, andalusite, sapphire, andradite-spessartine, nontronite, triplite, triphylite (α 1·706, β 1·715, 2V 43°), and haematite. A gossan at Klein Spitzkoppe yields cassiterite in a vuggy quartzose rock with cavities filled with malachite, chrysocolla, shattuckite, scorodite, chenevixite, and limonite. From a pegmatite in the same region gem beryl, occasionally approaching emerald, is mined, and is associated with topaz, fluorite, phenakite, and bertrandite. Rutile (granular masses and brilliant prismatic crystals 6 × 3 inches) at Giftkuppe forms mineralized zones in quartz-albite rock; and in the Kranzberg, gas vesicles in melaphyre overlying granite are filled by tourmaline, datolite, danburite, and axinite, the melaphyre itself being strongly tourmalinized. [M.A. **1**–238, **4**–411.] C. F. D.

Rice (H. M. A.). *Nelson map-area, east half, British Columbia.* Mem. Geol. Surv. Canada, 1941, no. 228, v + 83 pp., 2 pls., 2 text-figs., 1 map (1 inch to 4 miles). Price 25 cents.

Explanation of Map 603A covering the area 49–50° N., 116–117° W., in the Cordilleran region. The description of the geology includes modal analyses of

granitic rocks and 17 syenitic rocks, with common names and with numbers names according to the classification of A. Johannsen [M.A. **4**–483]. An count of the economic geology is followed by notes on numerous groups of nes and claims of which the most important is the Sullivan mine where 7000 s of silver-lead-zinc ore are milled daily. M. A. P.

RPENTER (A. C.). *New mineral localities in Kansas.* Trans. Kansas Acad. Sci., 1941, vol. 44, p. 264.

Octahedra of limonite pseudomorphous after pyrite or magnetite from Lincoln-e, Marion Co. Celestine, solid blue and fibrous pink, in limestone from nopolis, Ellsworth Co. Good crystals of gypsum from Kanopolis and Brook-c. L. J. S.

RTHROP (Stuart A.). *Minerals of New Mexico.* Bull. Univ. New Mexico, 1942, no. 379 (Geol. Ser. vol. 6, no. 1), 387 pp., map (1 inch = 19½ miles). Price $1.00 (bound $1.75).

An alphabetical catalogue of about 320 species of minerals that have been nd in New Mexico gives a summary of their general characters with lists of alities arranged under counties (some of which are new) and 156 mining tricts. Statements of modes of occurrence and paragenesis are, however, king, and in the longer (15 pp.) account of turquoise the nature of the mother-k is not even mentioned. Much of the information has been collected from the erature, but many new records are included. The prehistoric mining of tur-oise and the development of mining since 1535 are outlined. Lists are given of eworthy and museum specimens. Potash salt minerals have recently been covered in the Carlsbad district, Eddy Co. [M.A. **5**–168], and Iceland-spar of tical quality in Harding mine, Taos Co. [M.A. **8**–144]. A list of 24 meteorites given. A long bibliography and list of localities are added. In the latter the tinction between 'synonyms' and place-names within the 156 recognized ning districts is not clear. L. J. S.

GAU (A. A.) & BATES (J. D.). *Some little-known minerals of the Bear Mountain section of the Hudson highlands, New York.* Amer. Min., 1941, vol. 26, pp. 673–674.

Greenish-black octahedra (½ inch edge) of pleonaste (n 1·77) occur with ondrodite, diopside, magnetite, and chlorite in marble; mizzonite (ω 1·575, ·55) in hornblende-pyroxene-gneiss. L. J. S.

AINER (John N.). *Sixth year at Tilly Foster.* Rocks and Minerals, Peekskill, N.Y., 1942, vol. 17, pp. 8–9.

Further notes on collecting at the Tilly Foster mine, Brewster, New York. .A. **7**–550, **8**–109.] Three minerals (thomsonite, natrolite, and crocidolite) w to the locality have been found, and a specimen showing all the stages of eration of muscovite to serpentine. This suggests that the well-known pseudo-orphs of serpentine after periclase (?) may be after mica, or after clinochlore ich is very abundant at this mine. J. M. S.

Zodac (Peter). *A talc quarry near Chester, Vermont.* Rocks and Minerals, Peek kill, N.Y., 1940, vol. 15, pp. 369–371.

A short description of the occurrence of fine crystals of pyrite with magneti and actinolite in talc and in chlorite-schist at the Carlton quarry. A list minerals is given. J. M. S.

Broggi (Jorge A.). *Historia y geología de los yacimientos metálicos del Per* Proc. Eighth Amer. Sci. Congress, 1942, vol. 4, pp. 651–672.

Tello B. (Manuel) & Zuloaga (Guillermo). *Geología de los yacimientos metalífer y recursos minerales de Venezuela.* Ibid., pp. 681–691, 2 pls.

Ahlfeld (Friedrich). *Systematics and ore reserves of the Bolivian tin deposi* Ibid., pp. 697–699.

Cumings (W. L.). *Metallic mineral resources of Cuba.* Ibid., pp. 701–716.

Pérez (José Mejía). *Los recursos minerales de El Salvador.* Ibid., pp. 737–738.

The eighth American Scientific Congress met in Washington in 1940. Tl above papers from its Proceedings, published by the Department of Stat Washington, give synopses of the historical development, geology, mineralog and reserves of various metallic minerals in the countries named in the respecti titles. C. F. D.

Edwards (A. B.), Anderson (J. S.), & Hart (J. G.). *On the occurrence of platinu and palladium at the Thomson River copper mine, Victoria, with a note on t optical properties of braggite.* Proc. Australasian Inst. Mining & Metal 1942, no. 125, pp. 61–69.

The platinum in this nickeliferous copper ore occurs as very small grains sperrylite, in part intergrown with pyrite. Palladium, though more abundant the ore than platinum, has not been found as a separate mineral and is probab disseminated as an isomorphous constituent of one or more of the sulphic minerals (e.g. pentlandite, pyrrhotine, chalcopyrite, pyrite). The ore is of hydr thermal deposition. A note on the optical properties of braggite is added: th mineral proved inert to all etching agents. C. F. D.

Stillwell (F. L.) & Edwards (A. B.). *The mineral association of Tennant Cre gold ores.* Proc. Australasian Inst. Mining & Metall., 1942, no. 126, p 139–144, 5 pls.

The auriferous ore-bodies of Tennant Creek, Northern Territory, Australi form lenses of haematite (martitized magnetite) in schist. Native bismuth wit derived bismite and bismutite, remnants of magnetite, a little chalcopyrite, copper-bismuth mineral identified as wittichenite, and a trace of pyrite a associated with the gold, which is believed to have been deposited from gol bismuth hydrothermal solutions. C. F. D.

Stewart (Duncan, *Jr.*). *Minerals reported from Antarctica.* Rocks and Mineral Peekskill, N.Y., 1942, vol. 17, p. 12.

A classified list of 141 species and varieties compiled from 72 articles publishe since 1895. J. M. S.

Miscellaneous.

LYANKIN (D. S.) & PETROV (V. P.)] Белянкин (Д. С.) и Петров (В. П.) BELIANKIN (D. S.) and PETROV (V. P.). *An attempt to revise the chemical formula of the mineral hibschite.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 30, no. 5, pp. 420–423, 1 fig.

ibschite from Nikorzminda, Georgia, treated with 1/10N HCl to decompose ite and apophyllite and then centrifuged in heavy liquids gave analysis I h some garnet and flakes of silicic acid; loss on ignition 9·64) by V. A. Moleva, II (with 8 % garnet and 2 % calcite) by I. M. Shumilo. Deducting garnet calcite II gives $3(Ca,Mg)O.(Al,Fe)_2O_3.2(Si,Ti)O_2.2H_2O$. The associated garnet gr. 3·68, *n* 1·808–1·815) gave III (with 7·5 % hibschite; loss on ignition 2·30). A. **7**–462; **8**–145, 302.]

	SiO_2.	TiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MnO.	MgO.	CaO.	CO_2.	H_2O+.	H_2O-.	Total.
..	29·10	0·42	17·69	4·29	n.d.	n.d.	1·67	37·03	n.d.	n.d.	0·48	100·32
..	27·62	0·65	17·74	4·31	0·14	0·08	1·99	38·61	1·07	7·70	0·24	100·15
..	34·68	0·75	13·21	12·29	nil	0·06	0·84	36·00	n.d.	n.d.	0·24	100·37

L. J. S.

LYANKIN (D. S.) & PETROV (V. P.)] Белянкин (Д. С.) и Петров (В. П.). О гибшите и плазолите. [*On hibschite and plazolite.*] Доклады Акад. Наук СССР, 1941, vol. 32, pp. 66–68, 2 figs.

he original paper in Russian, the English translation of which has been viously abstracted [M.A. **8**–302]. L. J. S.

BST (A.). *Reexamination of hibschite.* Amer. Min., 1942, vol. 27, pp. 783–792, 2 figs.

Minute (0·08 mm.) octahedra isolated by dilute acetic acid from metamorsed marl from Marienberg, Bohemia, show a colourless mantle of hibschite 1·69 with slight birefringence) surrounding a core of cloudy garnet (*n* 1·76–7, corresponding with $Gr_{80}And_{20}$). They have sp. gr. 3·2–3·3 and a body-tred cell with cube edge *a* 12·00 Å. The photometric intensity curve shows only ht differences from those of grossular and plazolite, and there is no doubling he lines in the powder photograph (the calculated value for $Gr_{80}And_{20}$ being ut 11·9 Å.). [M.A. **7**–92.] L. J. S.

ORYKIN (A. Y.) & KETKOVICH (V. Y.)] Зворыкин (А. Я.) и Кетковић (В. Я.) ZVORYKIN (A. J.) and KETKOVIĆH (V. J.). *Concentrated phosphorus, potassium, ammonium and magnesium fertilizers from polygalite.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 27, pp. 464–465.

Large deposits of polyhalite have been found in bore-holes at several places in stern Kazakhstan and the middle Volga. Treated with phosphoric acid and n saturated with ammonia three-fourths of the mass is soluble in water and in 20 % HCl. L. J. S.

LEZINGER (N. A.), ZORKIN (F. P.), & PETUKHOVA (E. V.)] Шлезингер (Н. А.), Зоркин (Ф. П.) и Петухова (Е. В.) SCHLĖSINGER (N. A.), SORKIN (F. P.) and PETUCHOVA (E. V.). *Über die Enstehungsbedingungen des Kainits.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 27, pp. 466–469, 2 figs.

Deposits of kainite ($KCl.MgSO_4.3H_2O$) have been found at Ozinki, Saratov. sults are given for the solid and liquid phases in the systems KCl–$MgSO_4$–H_2O

and KCl–NaCl–$MgSO_4$–H_2O at 35° and 55° C., and the kainite area shown [illegible] diagrams. A solution of carnallite, kieserite, and sylvine (all from Ozin[illegible] yielded kainite, suggesting that this may be a secondary mineral in the depos[illegible]

L. J. S.

Lepeshkov (I. N.) & Bodaleva (N. V.) Лепешков (И. Н.) и Бодалева (Н. В. [illegible]. *Kieserite, bishofite and other salts discovered in salt deposits of the southern p[illegible] of the Permian sea.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. [illegible] pp. 978–982, 4 figs.

The salt deposits at Ozinki (Saratov), Kairovka and Kranoyarka (Chkalo[illegible] and Ishimbaevo (Bashkiria) are shortly described. Besides kainite, polyhali[illegible] carnallite, sylvine, halite, and glaserite, there occur bischofite, kieserite, glaub[illegible] ite, and thenardite.

M. H. H.

Miropolsky (L. M.) Миропольский (Л. М.). *Admixtures of barium and calcium [illegible] celestite.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 33, pp. 64–[illegible]

Eleven partial analyses of celestine mainly from calcareous rocks in the Vo[illegible] region show SrO 42·48–53·84, CaO 0·16–3·94, BaO trace–2·69, MgO nil–0·64 [illegible]

L. J. S.

[Miropolsky (L. M.) & Borovik (S. A.)] Миропольский (Л. М.) и Боров[illegible] (С. А.) Miropolsky (L. M.) and Borovick (S. A.). *Results of spect[illegible] analysis of celestite from the Upper Permian deposits of Tataria.* Com[illegible] Rend. (Doklady) Acad. Sci. URSS, 1942, vol. 34, pp. 114–116.

Spectrum analysis of crystals of celestine from the banks of the Volga sh[illegible] the presence of small amounts of Si, Ba, Ca, Ti and traces of Mg, Fe, Al, V, [illegible] Yt. The colour of the mineral is due to Ti and Fe. It is suggested that Si and [illegible] which are always present, enter into the lattice structure. No difference is sho[illegible] by material from different geological horizons, and no relation can be trac[illegible] between chemical composition and crystal-habit.

L. J. S.

[Borneman-Starynkevich (I. D.)] Борнеман-Старынкевич (И. Д.) Borneman Starinkevitch (I. D.). *Analysis and chemical formula of aeschynite.* Comp[illegible] Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 30, pp. 234–237.

An analysis of aeschynite from the Ilmen reserve, Urals, gave: Nb_2O_5 25·[illegible] Ta_2O_5 0·94, TiO_2 23·79, SiO_2 0·50, SnO_2 0·05, ThO_2 17·42, CeO_2 10·84, (La,N[illegible] $Pr)_2O_3$ 13·43, yttrium earths 0·89, Fe_2O_3 1·56, FeO 1·14, MnO 0·10, CaO 2·[illegible] PbO 0·12, H_2O- 0·14, H_2O+ 0·94, sum 99·86, sp. gr. 5·339; the ratio of t[illegible] ceria earths is Ce:La:Nd:Pr = 1:0·71:0·43:0·24; the methods of analysis a[illegible] described in detail. The formula is given as $(Ca,Ce'''',Th)(Nb,Ta,Ti,Fe'',Fe''')$ $(O,OH)_6$, or an isomorphous mixture of $(Ce^{iv},Th)Ti_2O_6$, $(Ce'''',La)NbTiO_6$, $CaNb_2O$ $CaFe''''NbO_4(OH)_2$, and $CaFe''NbO_3(OH)_3$.

M. H. H.

Kurbatov (S. M.) Курбатов (С. М.). *Axinite from the mine "Julia" of the Khal[illegible] province.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 30, pp. 428–4[illegible]

Greyish-violet granular axinite (sp. gr. 3·318, α 1·673, γ 1·682, 2V 70–7[illegible] occurs in small amount with diopside, garnet, epidote, copper-ore, &c. in ska[illegible] bands in limestone. Analysis, SiO_2 41·86, B_2O_3 6·09, Al_2O_3 16·81, Fe_2O_3 1·[illegible] FeO 7·30, MnO 3·35, MgO 2·34, CaO 20·28, Na_2O 0·02, K_2O 0·04, H_2O 0·72 [illegible] 100·16, agrees with $R''_7B_2(Al,Fe)_4(SiO_4)_8$.

L. J. S.